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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,877	02/14/2002	Takayuki Watanabe	020166	6745
23850	7590	06/08/2004	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP			GUERRERO, MARIA F	
1725 K STREET, NW			ART UNIT	
SUITE 1000			PAPER NUMBER	
WASHINGTON, DC 20006			2822	

DATE MAILED: 06/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/073,877

Applicant(s)

WATANABE ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-5, 7-10, 12 and 15-25 is/are pending in the application.
- 4a) Of the above claim(s) 7, 8, 12, 15, 16 and 23-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2 and 17-22 is/are rejected.
- 7) ☒ Claim(s) 3-5, 9 and 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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### **DETAILED ACTION**

1. This Office Action is in response to the Amendment filed November 21, 2003.
2. Claim 1, 6, 11, and 13-14 are canceled.  
Claims 2-5, 7-10, 12, 15-25 are pending.

### ***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Election/Restrictions***

4. Applicant's election of Species I (claims 2-5, 9-10, 17-22) in Paper filed March 17, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 7-8, 12, 15-16, 23-26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper filed March 17, 2004.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 2 and 17-22 rejected under 35 U.S.C. 102(e) as being anticipated by Watanabe et al. (U.S. 2002/0119661 A1).

The applied reference has a common inventor with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Watanabe et al. teaches forming a stacked structure of a first III-V compound semiconductor layer (102) (InGaAsP) containing In and having a composition different from InP and forming a second III-V compound semiconductor layer (InP)(103) containing In directly on the first III-V compound semiconductor layer (Fig. 17A, paragraphs 0176-0178). Watanabe et al. shows growing an InP layer (106) at regions adjacent the stacked structure to form a stepped structure of InP and the stacked structure together with the stepped structure defining a composite structure (Fig. 17C,

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paragraph 0178). In addition, Watanabe et al. teaches wet-etching the composite structure using an etchant containing hydrochloric acid, acetic acid and water (Fig. 17D, paragraphs 0179-0180).

Furthermore, Watanabe et al. teaches obtaining a planar surface on a (100) plane and using water and hydrogen peroxide (paragraphs 0179-0180).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 17, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (U.S. 5,568,501) in view of Adachi et al. ("Chemical Etching of InGaAsP/InP DH Wafer").

Otsuka et al. teaches forming a stacked structure of a first III-V compound semiconductor layer (2) (InGaAsP) containing In and having a composition different from InP and forming a second III-V compound semiconductor layer (20) (InGaAsP) containing In directly on the first III-V compound semiconductor layer (Fig. 1A-2A, 3A-3B, col. 6, lines 55-67, col. 7, lines 1-5, 30-40). Otsuka et al. shows growing an InP layer (6) at regions adjacent the stacked structure to form a stepped structure of InP (Fig. 2A, 3C, col. 7, lines 9-15, 30-35). In addition, Otsuka et al. teaches wet-etching

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the second III-V compound semiconductor layer using an etchant containing acetic acid and thinning the InP layer (6) (Fig. 2A, col. 7, lines 35-55).

Furthermore, Otsuka et al. shows using an etchant containing hydrochloric acid to adjust the stripe height (col. 7, lines 40-45). Otsuka et al. discloses removing the second III-V compound semiconductor layer using an etchant containing acetic acid (Fig. 3B-3C, col. 9, lines 40-47). Otsuka et al. teaches obtaining a planar surface on a (001) plane (Fig. 2A, 3C, col. 8, lines 30-33, col. 14, lines 35-45).

Otsuka et al. does not expressly teach wet-etching the composite structure using an etchant containing hydrochloric acid and acetic acid. However, Adachi et al. teaches using the etchant containing hydrochloric acid and acetic acid to etch an InP layer (Table 1, page 1054). Adachi et al. also teaches the etchant comprising water and or hydrogen peroxide (Table 1, page 1054).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Otsuka et al. process by including the use of the etchant contain hydrochloric acid and acetic acid as taught by Adachi et al. in order to better control the etching process and to avoid overetching.

***Allowable Subject Matter***

7. Claims 3-5 and 9-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

8. Applicant's arguments with respect to claims 2 and 17-22 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsukiju et al. (U.S. 5,441,912) and Kimura et al. (U.S. 5,452,315) teach several steps related to applicant's disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Maria Guerrero*  
Maria Guerrero  
Primary Examiner  
May 28, 2004